and Huron, 70; Alpena and Pierre, 68; North Platte, Port Huron, and Concordia, 65. The smallest values were: Key West and Galveston, 21; Port Eads, 22; Eureka, 26; Corpus Christi, 27.

The *limit of freezing weather* is shown on Chart VI by the isotherm of minimum 32° and the limit of frost by the isotherm of minimum 40°.

FROST.

Reports of damage by frost were received from the following States on the respective dates:

10th.—Idaho.
11th.—North Dakota and Iowa.
12th.—Iowa, Missouri, Minnesota, Nebraska, and Ohio.
13th.—New York, Ohio, Pennsylvania, Minnesota, Missouri, Virginia, West Virginia, Tennessee, and Kentucky.
14th.—Wisconsin, Massachusetts, Illinois, Iowa, Connecticut, Vermont, and Alabama.
15th.—Michigan.
16th.—Michigan and Missouri.
17th.—New York, New Jersey, Ohio, Kansas, and Connecticut.
18th.—Alabama.
19th.—Pennsylvania and South Dakota.
20th.—South Dakota, Pennsylvania, and New York.
21st.—Michigan, South Dakota, Minnesota, Iowa, and New York.
22d.—Alabama and New York.

The frosts of the 13th, 14th, 19th, 20th, and 21st in Pennsylvania and western New York are said to have been nearly as severe as the great freeze of the 4th and 5th of June, 1859. The grape crop was severely injured.

Special reports forwarded by the Weather Bureau observer at Erie state that, by the frosts of the 12th and 20th in northwestern Pennsylvania, grapes, early apples, pears, cherries, early roses, strawberries, corn, and tomatoes, so far as they were above ground, were pretty generally killed. From Sunday night (May 12) to Tuesday night (May 21) the thermometer at nighttime ranged from 21° to 22°, and was nowhere above 24°; in the daytime the range was from 44° to 50°. The previous warm or hot spell had brought vegetation forward remarkably; the grape shoots that are now all gone were 6 and 10 inches long.

HOT WINDS.

At Concordia, Kans., the maximum temperature of the month, 100° on the 8th, was accompanied by a very dry atmosphere, withering vegetation, especially corn. On the 9th a very hot, dry, southwest wind backing to southerly was also very injurious, especially to fruit.

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by means of the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the *temperature of the wet-bulb thermometer*. An evaporometer may be made to record the quantity of water evaporated from a similar surface during any interval of time. This, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this evaporation the *average humidity of the air* during any given interval of time may be deduced.

The *sensible temperature* experienced by the human body and attributed to the atmosphere depends not merely upon the temperature of the air, but equally upon the dryness and the wind, and is apparently the same as the temperature of the wet-bulb thermometer as obtained by the whirling apparatus used in the shaded shelter. The temperature of the wet-bulb thermometer and its depression below the dry bulb are the fundamental data for all investigations into the relation between human physiology and the atmosphere. In order to present a monthly summary of the atmospheric conditions from a hygienic and physiological point of view, Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time.

PRECIPITATION.

[*In inches and hundredths.*]

The *distribution of precipitation* for the month of May, 1895, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III.

The precipitation for the current month was heaviest, 6 to 13 inches, on the coasts of Washington and Oregon, and 5 to 10 inches in eastern Texas, but least, namely, zero, in portions of Arizona, Idaho, and southern California.

The *diurnal variation* is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The *normal precipitation* for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was in excess in the west Gulf States and on the coasts of Washington and Oregon. It was deficient in the eastern Rocky Mountain slope. The large excesses were: Port Eads, 7.5; Neah Bay, 6.3; Fort Canby, 5.5; Astoria, 5.3. The large deficits were: Omaha, 3.4; Meridian, 3.8; Concordia, 3.2; Indianapolis, 3.1.

The *average departure* for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normal exceeds 100):

Above the normal: East Gulf, 128; west Gulf, 131; North Dakota, 126; southern plateau, 444; middle plateau, 113; northern plateau, 121; north Pacific, 216; middle Pacific, 119.

Below the normal: New England, 97; middle Atlantic, 97; south Atlantic, 95; Florida Peninsula, 82; Ohio Valley and Tennessee, 64; Lower Lake, 78; Upper Lake, 97; Upper Mississippi, 69; Missouri Valley, 65; northern slope, 71;

middle slope, 59; Abilene (southern slope), 45; southern Pacific, 75.

The *years of greatest and least precipitation* are given in the REVIEW for May, 1894. The precipitation for the current month was the greatest on record at Neah Bay, 10.77; Fort Canby, 8.19; Astoria, 8.52; Olympia, 5.93; Pueblo, 2.45; Santa Fe, 3.46; Port Eads, 10.27; Norfolk, 8.60. It was the least on record at Eastport, 1.29; Columbus, Ohio, 1.73; Indianapolis, 1.07; Memphis, 0.46; Springfield, Mo., 3.54; Concordia, 1.01; Baker City, 1.25; Havre, 0.43.

The *total accumulated monthly departures* from normal precipitation from the beginning of the year to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
Excesses.	*Inches.*	*Per ct.*	*Deficits.*	*Inches.*	*Per ct.*
South Atlantic	+ 2.20	110	New England	— 3.10	84
Florida Peninsula	+ 0.50	103	Middle Atlantic	— 0.40	98
North Dakota	+ 0.20	103	East Gulf	— 1.00	96
Southern plateau	+ 0.40	116	West Gulf	— 3.90	80
North Pacific	+ 1.20	104	Ohio Valley and Tenn.	— 6.20	71
Normal.			Lower Lakes	— 3.80	72
Northern slope	0.00	100	Upper Lakes	— 2.60	78
			Upper Mississippi	— 5.10	61
			Missouri Valley	— 4.00	67
			Middle slope	— 2.90	66
			Southern slope (Abilene)	— 4.50	64
			Middle plateau	— 0.80	96
			Northern plateau	— 2.10	76
			Middle Pacific	— 1.60	91
			South Pacific	— 2.10	82

Details as to excessive precipitation are given in Tables XIII and XIV.

The total snowfall at each station is given in Table II.

HAIL FOR MAY, 1895.

The following are the dates on which hail fell in the respective States:

Alabama, 2, 5, 6, 7. Arkansas, 1, 5, 6, 15. California, 10, 13, 16, 26, 27, 28. Colorado, 16, 21 to 24. District of Columbia, 14. Florida, 6, 10, 20. Idaho, 3, 9, 20, 26, 27, 28. Illinois, 2, 4, 5, 6, 8, 10, 14, 17, 18, 21. Indiana, 2, 5, 6, 10, 13; Indian Territory, 15, 20, 24, 30. Iowa, 1 to 7, 11, 12, 20, 28. Kansas, 1, 3, 5, 6, 8, 10, 15, 29, 30. Kentucky, 2, 12, 13, 14. Louisiana, 1, 4, 5, 11, 23. Maine, 8. Maryland, 7, 11, 12, 14. Massachusetts, 2, 15. Michigan, 6, 10, 12, 17, 20. Minnesota, 1 to 4, 8, 9, 10, 12, 14, 16 to 21, 24, 28, 29, 30. Mississippi, 1, 2. Missouri, 1, 3, 4, 6 to 11, 14, 15, 18, 19. Montana, 10. Nebraska, 1 to 8, 10, 11, 15, 19, 23, 29, 30. Nevada, 15, 18, 19, 27, 28, 29, 31. New Hampshire, 15, 31. New Jersey, 14. New Mexico, 18, 20, 22 to 25, 29, 30. New York, 7, 8, 11, 12. North Carolina, 5, 6, 14, 16, 21, 26. North Dakota, 2, 3, 14, 18, 24. Ohio, 5, 8, 10, 11, 13, 20, 22, 23. Oklahoma, 29. Oregon, 7, 8, 9, 20, 21, 26, 27, 28, 30, 31. Pennsylvania, 4, 11. South Carolina, 11, 16. South Dakota, 1, 2, 3, 5, 10, 12, 15, 26. Tennessee, 2, 11, 12, 13. Texas, 1, 4, 5, 15 to 18, 21 to 25. Utah, 17, 28, 31. Vermont, 8. Virginia, 11, 15, 19, 20. Washington, 3, 4, 6, 7, 8, 20, 21, 26 to 31. West Virginia, 6, 10, 12, 20. Wisconsin, 3 to 7, 9 to 12, 17, 18, 26, 27. Wyoming, 3, 31.

SLEET FOR MAY, 1895.

The following are the dates on which sleet fell in the respective States:

Alabama, 2. California, 28. Colorado, 10, 16, 20, 21, 23, 29, 30, 31. Idaho, 30, 31. Indiana, 13. Iowa, 9, 10, 20. Kentucky, 15. Michigan, 11, 13, 14, 26. Minnesota, 18, 19. Montana, 9, 28. Nebraska, 19. Nevada, 2, 27, 28, 30, 31. New York, 12. North Dakota, 19. Ohio, 13, 14. Oklahoma, 11. Oregon, 3, 26. Pennsylvania, 12, 19. South Dakota, 18. Tennessee, 12. Utah, 27, 28, 31. Washington, 4. Wisconsin, 4, 11, 12, 13, 15, 31.

HAIL FOR FEBRUARY, 1895.

The following are the dates on which hail fell in the respective States:

Alabama, 19. Arizona, 13. California, 12, 22. Florida and Georgia, 19. Illinois, 20. Louisiana, 9. New Mexico, 25, 26. South Carolina, 19. Utah, 24. Washington, 15, 23.

SLEET FOR FEBRUARY, 1895.

The following are the dates on which sleet occurred in the respective States:

Alabama, 11, 12, 14, 15. Arkansas, 6, 10, 11, 18. California, 12. Colorado, 23, 24, 25, 28. Connecticut, 25, 28. Delaware, 16. Florida, 14, 15. Georgia, 6, 7, 10, 11, 12, 14, 15, 16. Idaho, 13, 17, 23. Illinois, 9, 10, 20. Indiana, 6, 9, 10. Iowa, 17. Kansas, 17, 18. Kentucky, 20. Louisiana, 5, 7, 9 to 16, 19. Maine, 8, 18. Maryland, 2, 7, 16, 22, 27. Massachusetts, 8, 27. Michigan, 20, 21, 24, 25. Minnesota, 20. Mississippi, 6, 9 to 12, 15, 19, 22. Missouri, 6, 7, 17, 18, 22, 25. Montana, 21. Nebraska, 1, 17, 18. Nevada, 8 to 13, 22, 24. New Jersey, 1, 2, 4, 7, 8. New York, 9, 19, 27, 28. North Carolina, 2 to 5, 7, 12, 15, 16, 17. Ohio, 3, 7, 14, 17, 18, 21. Oregon, 11, 12, 15, 23. Pennsylvania, 2. Rhode Island, 8. South Carolina, 6, 7, 11, 12, 15, 16, 19. South Dakota, 28. Tennessee, 5, 6. Texas, 1, 9, 10, 11, 13. Utah and Vermont, 25. Virginia, 16, 17. Washington, 11. West Virginia, 22. Wisconsin, 19, 20.

HAIL FOR MARCH, 1895.

The following are the dates on which hail fell in the respective States:

Alabama, 13. Arizona, 14. Arkansas, 15, 20. California, 12 to 15, 17, 20, 21, 22, 27, 28. Colorado, 4, 30. Connecticut and Delaware, 25. Georgia, 13, 14, 20. Idaho, 28. Indiana, 24, 25. Indian Territory, 30, 31. Kansas, 19, 24, 31. Kentucky, 8, 24, 25. Louisiana, 13, 14. Maryland, 9, 25. Massachusetts, 25, 26. Mississippi, 12 to 15. Missouri, 19, 26 to 31. Nebraska, 31. New Jersey, 25, 29. New Mexico, 12, 18. New York, 25, 26. North Carolina, 7. North Dakota, 30. Ohio, 24, 25. Oregon, 20 to 23, 26 to 29. Pennsylvania, 2, 15, 25, 28. South Carolina, 2. South Dakota, 31. Tennessee, 8, 15, 20. Texas, 10, 12, 13, 25, 29, 31. Utah, 12, 13, 28, 29. Virginia, 2, 8, 30. Washington, 2, 11, 14, 15, 19 to 23, 28, 29, 30. West Virginia, 25. Wisconsin, 23.

SLEET FOR MARCH, 1895.

The following are the dates on which sleet fell in the respective States:

Arkansas, 6, 14, 15, 16, 19. California, 13, 15. Colorado, 13, 14, 28 to 31. Connecticut, 2, 13, 15, 16, 28. Delaware, 3, 11, 15, 16, 29. District of Columbia, 2, 9, 11, 15, 20. Georgia, 21. Idaho, 12, 21. Illinois, 1, 11 to 15, 30, 31. Indiana, 8, 11, 14, 15, 20. Indian Territory, 14. Iowa, 7, 12, 29, 31. Kansas, 3, 10, 11, 13, 14, 19, 20, 30, 31. Kentucky, 8, 14, 15, 16, 20, 21. Maine, 9, 15, 24, 25. Maryland, 2, 11, 14, 15, 16, 19, 20, 24, 25. Massachusetts, 2, 4, 5, 16, 22, 25, 28. Michigan, 1, 8, 12, 26, 29, 30, 31. Minnesota, 7, 22, 24, 29, 30, 31. Mississippi, 1, 2, 20. Missouri, 3, 8, 10 to 15, 19, 20, 25, 26. Montana, 7, 22, 23. Nebraska, 8, 10, 30, 31. Nevada, 13, 14, 17, 18, 27, 28, 29. New Hampshire, 25, 26. New Jersey, 2, 11, 12, 14, 15, 16, 24, 29, 30. New York, 14, 15, 25, 29, 30. North Carolina, 3, 19, 20, 21, 24. North Dakota, 6, 31. Ohio, 1, 4, 7, 8, 9, 11, 13 to 17, 20, 31. Oklahoma, 13, 14, 19. Oregon, 2, 11, 12, 14, 20, 21, 22, 28. Pennsylvania, 2, 9, 12 to 15, 24, 25, 29, 30. Rhode Island, 2, 5. South Dakota, 9, 14, 31. Tennessee, 2, 4, 8, 16. Texas, 14. Utah, 12, 29. Virginia, 2, 20, 24. Washington, 20 to 23, 28. West Virginia, 14, 15, 16, 19, 20, 25, 27. Wisconsin, 23, 30, 31.